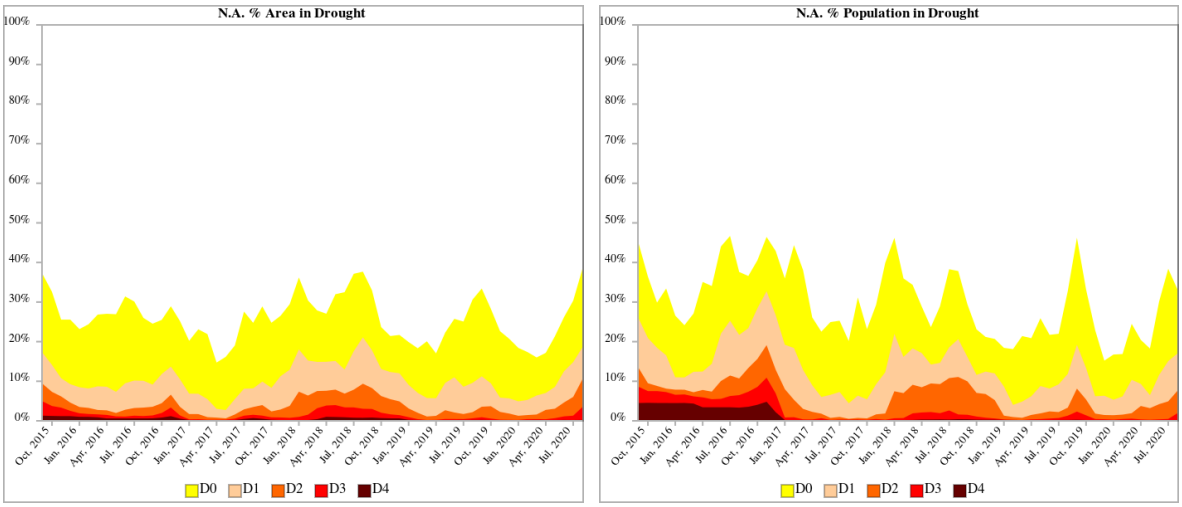
North American Drought Monitor – August 2020

At the end of August 2020, moderate to exceptional drought (D1-D4) affected 18.4% of the area and 16.9% of the population of North America. The percent area value was 3.7% more than the value for the end of July 2020. The percent population value was 1.9% more than the value for the end of July. At the end of August, 72.6% of the Rio Grande/Bravo River Basin and 37.9% of the Great Plains were in moderate to exceptional drought, 28.7% of the Columbia River Basin was in moderate to extreme drought (D1-D3), and 5.8% of the Great Lakes Basin was in moderate drought. The North American Great Plains extends across the United States and into adjacent parts of northeast Mexico and the southern Prairies of Canada. The percent area values for the Great Plains and the Columbia and Rio Grande/Bravo River Basins increased this month, while the value for the Great Lakes Basin decreased compared to the end of July.



CANADA:

National Overview

Dry conditions across Canada expanded significantly in the month of August. More than twenty-five percent of the country was considered Abnormally Dry (D0) or in drought; this represents a nearly ten percent increase since the end of July. The Atlantic region continues to be the hardest hit area where agricultural crops yields and water supplies have been impacted by well below-normal summer precipitation and above-normal temperatures. Southern parts of the Prairies experienced both prolonged heat and a lack of precipitation this month, leading to a significant expansion of Abnormally Dry (D0) and Moderate Drought (D1) conditions. Areas in British Columbia bordering with Alberta were also impacted by a lack of precipitation, where as, along the west coast remaining dry spots were ameliorated. Drought concerns have decreased in parts of southern Ontario and Quebec as the region received substantial precipitation this month.

Pacific (BC)

Drought and abnormally dry conditions persisted in the southern interior of British Columbia resulting in a considerable expansion of the Abnormally Dry (D0) classification from Ashcroft eastward to the B.C.-Alberta border. Streamflow is still adequate in this region due to high winter snow pack, however continued hot and dry conditions decreased soil moisture throughout the region. Precipitation in this area is near normal according to long-term indicators, however below-normal summer precipitation has resulted in significant deterioration of conditions. For this reason, the pocket of Moderate Drought (D1) in the Osoyoos area remains in place. Other D1 pockets emerged from Merritt to Princeton, where precipitation was up to 75 percent below-average in August, and from Cranbrook into southern Alberta where precipitation was extremely low in the last 60 days. Despite below-normal rainfall this past month in the central interior, good moisture from previous months has resulted in this area not being included in the D0 region, but will be watched closely to see if conditions continue to worsen. The west coast continued to improve with abnormally high precipitation. Over the last 30 days, Vancouver Island received well above-average precipitation, including 150-200 percent of average in much of the previously dry region, leading to the removal of Abnormally Dry (D0) and Moderate Drought (D1) conditions. Although the east coast of Vancouver Island has received good precipitation through the summer (125-150 percent of average), long term water deficits exist. However, at this point there are no drought concerns. Above-average precipitation also improved dry conditions along the southwestern coast and the Lower Mainland. Vancouver reported above-average precipitation resulting in the removal of D0 in this area. Approximately fourteen percent of the province was classified as Abnormally Dry (D0) or in Moderate Drought (D1), up eight percent compared to last month; this includes thirty-one percent of the agricultural landscape.

Prairies (AB, SK, MB)

In the month of August, Abnormally Dry (D0) and Moderate Drought (D1) conditions expanded across much of the southern Prairies. Approximately thirty-one percent of the Prairie region was classified as either Abnormally Dry (D0) or in Moderate Drought (D1); this includes nearly sixty percent of the region's agricultural landscape. Although August is typically a dry month in the Prairies, precipitation in southern Alberta has been well below-normal in the last 30 days with growing concern over rapid ripening of crops, grass fires and soil moisture reserves. D0 conditions expanded from Grand Cache south to the U.S. border and from the Rockies east towards the Saskatchewan border. The foothills southwest of Calgary were the driest part of the province, showing below-normal precipitation in the last 60 days, and as such warranted a Moderate Drought (D1) classification. Crop growth across Saskatchewan seemed promising in July having received much-needed moisture. However, heat stress from prolonged warm temperatures combined with below-normal precipitation led to rapid crop quality deterioration and reports of premature ripening and poor grain fill, reduced surface water supplies and wildfires. In August, Abnormally Dry (D0) conditions emerged as well as pockets of Moderate Drought (D1) from Saskatoon to Regina, near Moose Jaw, and in southwestern Saskatchewan. Similarly, much of southern and central Manitoba is in Abnormally Dry (D0) conditions despite heavy precipitation received near Brandon in early July. The heavy precipitation fell in a short period of time which was most likely lost to runoff leaving crops and soils with little improvement. As a result, surface soil moisture,

root zone soil moisture and groundwater levels are all dry in this area. A pocket of Moderate Drought (D1) remains north of Winnipeg due to significant dryness over the last six months.

Central (ON, QC)

Concern for drought in southern Ontario has lifted substantially from the previous month. While a dry pocket remains in place south of Toronto, all drought regions within the southern portion of the province were reduced. Significant precipitation during August resulted in substantially improved conditions and moisture levels. Precipitation indicators suggest near-normal conditions taking into account the short- and long-term indicators. A swath of precipitation from Ottawa towards Montreal and Trois-Rivières helped to alleviate dry conditions where 150 percent to upwards of 200 percent above-normal precipitation was received. Wildfires in northwestern Ontario were significant in August. Some First Nation communities were required to evacuate due to the concern of smoke affecting the health and safety of residents. Mid-month precipitation helped to alleviate these concerns, but longer-term dry conditions still remain. Numerous pockets of 25 to 50 percent below-normal in the last 60 days are scattered across northwestern Ontario and have been categorized as Abnormally Dry (D0). Significant dryness has also developed in northern Quebec within the last 3 months. A large swath of this area has seen 75 percent below-normal precipitation according to satellite-derived data. Even though there has been a significant reduction in drought throughout southern parts of Ontario and Quebec, thirty-five percent of the Central region still remains in either Abnormally Dry (D0), Moderate Drought (D1) or in Severe Drought (D2); this includes thirty-six percent of the agricultural landscape.

Atlantic (NB, NS, PEI, NL)

Excessive and persistent dryness continues to plague the Atlantic region where nearly all of New Brunswick and most of Prince Edward Island are in Severe Drought (D2) or Extreme Drought (D3). Approximately twenty percent of the Atlantic region is classified as in drought; this includes eighty percent of the region's agricultural landscape. Given that the region did not receive adequate precipitation this month, there was minimal relief to the impacts of drought to crop quality or quantity for the growing season. An area including Moncton, Bouctouche and Charlottetown received less than 230 mm below-average precipitation in the past 6 months; this has led to the rare development of Extreme Drought (D3) in the region. This prolonged and persistent lack of precipitation has had a significant impact on producers as crops are drying up or haven't come up at all. Streamflow levels also continue to struggle as many stations report levels in the 10th percentile or lower. This dryness not only extends south in Nova Scotia, but it also includes the southwestern tip of Newfoundland; this is especially prevalent in the Standardised Precipitation Evapotranspiration Index (SPEI) product over the past three months. This has resulted in the formation of a couple Moderate Drought (D1) pockets, as well as an area of Severe Drought (D2) near Yarmouth.

Northern (YT, NWT)

Precipitation received in the Northern region of the country centred around the southern borders of B.C., Alberta and Saskatchewan. These areas received upwards of 100 percent

above-normal or more precipitation in the last 30 days. However, dry spots still remain scattered throughout the remainder of the region. This includes areas south of Great Bear Lake, near Fort Good Hope extending northward, a small pocket south of Faro as well as a pocket along the Yukon-N.W.T. border. Many of these areas have only seen 25 to 50 percent of normal precipitation in the last 30 days. An area of Abnormally Dry (D0) conditions also emerged around Old Crow, Yukon where 79 percent of normal precipitation has been received in the last 90 days. Nine percent of the Northern region is classified as being Abnormally Dry (D0), up five percent from the previous month.

UNITED STATES: The atmospheric circulation over the contiguous U.S. (CONUS) during August 2020 consisted of sub-tropical high pressure across the southern states with a storm track that was deflected to the northern states and across the U.S.-Canadian border. Upper-level troughs moving in the jet stream flow sometimes broke through the ridge in the eastern CONUS, sending cold fronts plunging across the Plains into the Deep South. Several Atlantic tropical systems were steered into the eastern CONUS, also weakening the subtropical ridge. These included Hurricane Isaias, which drenched Puerto Rico and the U.S. Virgin Islands at the end of July then moved up the East Coast in early August; Tropical Storm Marco, which affected the Gulf of Mexico coast during the last half of the month; and Hurricane Laura, which made landfall near the end of the month in Louisiana then moved up the Lower Mississippi and Ohio Valleys, eventually exiting the CONUS along the Mid-Atlantic coast. When averaged across the month, the upper-level circulation pattern consisted of an anomalously strong ridge centered over the Southwest and southern Plains, with a trough extending from the Gulf of Mexico to the Great Lakes. The ridge kept temperatures warmer than normal across the western half of the CONUS, with record heat widespread in the Southwest, and a southerly flow contributed to a warmer-than-normal month in the Northeast. August monthly temperatures averaged at least 4.0°F (more than 2.2°C) above normal from California to Colorado and western Texas, with values exceeding 6.0°F (more than 3.3°C) in parts of this region. The trough and its associated cold fronts, and clouds and rain associated with tropical systems, gave parts of the Plains to Ohio Valley a cooler-than-normal month. The ridge in the west and an associated northwesterly flow over the interior CONUS kept the month drier than normal from the West Coast to Great Plains and into the Mid-Mississippi Valley, with some areas experiencing a record dry August. Fronts, surface lows, and tropical systems brought above-normal precipitation to the Upper Mississippi Valley and from the Lower Mississippi Valley to East Coast. A trough over the Gulf of Alaska brought cooler-than-normal temperatures to the Alaska panhandle and a wetter-than-normal month to the panhandle and southeast interior Alaska while a ridge over northern Alaska kept the rest of the state warmer and drier than normal for the month.

Drought or abnormal dryness expanded or intensified across much of the West, Plains, Midwest, and New England, and in Alaska and Hawaii. Drought or abnormal dryness contracted in parts of the Great Lakes and Southeast. Drought expansion exceeded contraction with the U.S. Drought Monitor (USDM)-based national moderate-to-exceptional drought footprint across the CONUS rising from 32.7 percent at the end of July to 39.4 percent at the end of August (from 27.4 percent to 33.3 percent for the 50 States and Puerto Rico). Two-thirds (67.6 percent) of the 11-state Western region was in moderate to exceptional drought as of September 1, according to the USDM, while three-fourths (75.8

percent) of New England was experiencing moderate to severe drought and about 44.4 percent of the Great Plains was in moderate to exceptional drought. Drought covered over three-fourths (82.8 percent) of Iowa with extreme drought entrenched in the western third of the state. Nearly half (47.2 percent) of Hawaii was in moderate to severe drought. Abnormal dryness expanded to cover a third of Alaska, with moderate drought developing in a couple spots in the northwest and south.

Historical Perspective: According to preliminary data provided by the National Centers for Environmental Information, the CONUS experienced its third warmest and 28th driest August in the 126-year period of record. The nation's monthly average temperature of 74.7°F (23.7°C) was 2.6°F (1.4°C) above the 1901-2000 mean, while precipitation averaged 2.35 inches (59.7 mm)—0.27 inch (6.9 mm) below average.

Statewide temperature rankings ranged from the 25th-coolest August in Missouri to the hottest August on record in six western states—California, Nevada, Utah, Arizona, Colorado, and New Mexico. Eleven other states in the West, South, and Northeast had a tenth hottest, or hotter, August. Statewide precipitation rankings ranged from the driest August on record in three states to the seventh wettest in two (Arkansas and Virginia). The three record-dry states were Arizona, Utah, and Nebraska. New Mexico ranked second driest, Iowa third driest, and Colorado and Wyoming both fifth driest. Fourteen other states in the West, Plains, Midwest, and New England ranked in the driest third of the historical record.

Arizona and Utah had the distinction of experiencing both the hottest and driest August on record. The combination of excessive heat and excessive dryness resulted in a record dry Standardized Precipitation Evapotranspiration Index (SPEI) for several states. These included Arizona, California, Colorado, New Mexico, Nevada, Utah, and Wyoming. Arizona had the hottest and driest summer (June-August), while New Mexico ranked second hottest and second driest. These combinations gave both of these states the driest-ever SPEI for summer.

Agricultural, Hydrological, and Wildfire Highlights: The extremely hot temperatures, especially in the Southwest and parts of the Northeast, increased evapotranspiration (ET) which exacerbated drought conditions for the areas that had below-normal rainfall. The high ET and low precipitation further dried soils and stressed vegetation. This was especially true in the Southwest, Northeast, and all along the High Plains, but also from the central Plains to the Ohio Valley and other parts of the West. Many of the streams and groundwater levels were low in these areas. Dozens of large wildfires raged across the West and Plains, with nearly 4 million acres burned nationwide so far this year, double the value from a month ago, according to an August 31 National Interagency Coordination Center report. Reports received from the CoCoRaHS Condition Monitoring Resource included crop and livestock issues (reduced yields and pasture/forage, plant/animal stress, drying ponds and lakes), fire impacts, air quality problems, dry lawns, and wildlife concerns.

As noted in a U.S. Department of Agriculture (USDA) August 30 report, topsoil moisture was short or very short (dry or very dry) across 50 percent or more of all of the states in the West and Great Plains except Arizona and North Dakota, and ranged from 52 percent in South Dakota to 91 percent in New Mexico. Topsoil moisture was short or very short in 81

percent of Iowa, 52 percent of Illinois, 53 percent of Ohio, 70 percent of Rhode Island, 96 percent of New Hampshire, and 85 percent of Maine. Subsoil moisture was short or very short across 75 percent of California, 82 percent of Colorado, 70 percent of Idaho, 77 percent of Iowa, 88 percent of Maine, 67 percent of Montana, 62 percent of Nebraska, 50 percent of Nevada, 82 percent of New Hampshire, 92 percent of New Mexico, 54 percent of Ohio, 58 percent of Oklahoma, 79 percent of Oregon, 56 percent of Pennsylvania, 65 percent of Rhode Island, 77 percent of Texas, 59 percent of Utah, 64 percent of Washington, and 80 percent of Wyoming. Pasture and rangeland were in poor to very poor condition in Arizona (68 percent), California (55 percent), Colorado (56 percent), Connecticut (60 percent), Iowa (49 percent), Massachusetts (60 percent), New Mexico (55 percent), Oregon (76 percent), Rhode Island (60 percent), Texas (53 percent), and Wyoming (73 percent). Nationwide, 50 percent of the topsoil and 48 percent of the subsoil was short or very short of moisture, 46 percent of the pasture and rangeland was in poor to very poor condition, and 28 percent of the cotton crop, 14 percent of the corn crop, and 10 percent of the soybean crop were in poor to very poor condition. These national statistics were all increases from a month ago.

Based on the September 1st USDM, drought affected approximately 33 percent of cattle inventory, 32 percent of corn production, 23 percent of soybean production, 24 percent of hay acreage, 24 percent of winter wheat production, and 11 percent of spring wheat production. Except for winter wheat, these were all increases compared to the end of July.

On September 1, statewide reservoir storage in the western United States as a percent of average for the date was mostly near or above normal in the northern states (Idaho, Montana, Utah, Washington, and Wyoming), but near to below normal in the southern states (Arizona, California, Colorado, Nevada, New Mexico, and Oregon). It was significantly below average in New Mexico at about 22 percent of capacity. Elephant Butte Reservoir, the largest in the state (capacity 2195.0 thousand acre-feet), had only 108.6 thousand acre-feet (KAF) of water, or 5 percent of capacity. The second to fourth largest reservoirs were also below to much below capacity – Navajo Reservoir (capacity 1696.0 KAF) was at 71 percent of capacity, but Abiquiu Reservoir (capacity 1192.8 KAF) was at 4 percent and Brantley Lake near Carlsbad (capacity 1008.2 KAF) was at one percent.

MEXICO: Although August 2020 saw an increase in tropical cyclone activity near coastal Mexico, compared with the previous month, the national rainfall in August was 122.3 mm (4.81 in), 12.4 mm (0.49 in) below the long-term mean or 90.7% of the August average, making it as the 22nd driest August since 1941.

Above-normal rain fell from the west to central northern areas, as well as the southern and the southeast areas. The main rainfall events throughout the month were caused by the proximity of Hurricanes Elida and Genevieve, Tropical Storm Hernan, as well as a trough (the most extensive associated with the North American Monsoon), the passage of 10 tropical waves and moisture coming from the Pacific, Gulf of Mexico and the Caribbean Sea. The maximum daily rainfall over the month was reported in Cihuatlán, Jalisco, with 475.8 mm (18.73 in) on August 17th, when Tropical Storm Hernan tracked near the coast of Jalisco state. Regarding the monthly rainfall classification dating from 1941, the rainiest states were Colima, which had their wettest August, followed by Jalisco and Morelos (fifth wettest

August), and Guerrero with their eighth wettest August. For the period from June to August, Colima and Yucatán had their wettest period, Quintana Roo their third, and Morelos and Campeche their fourth and fifth wettest period, respectively.

Most of the rains in the west helped to reduce abnormally dry areas and moderate drought (D0-D1) in Nayarit and Jalisco, where D0-D1 coverage decreased from 70.6% to 43.7% in Nayarit, and from 64.9% to 54.6% in Jalisco, over the last month. The D0-D1 areas also decreased in eastern San Luis Potosí, Querétaro, Hidalgo, Morelos, Mexico State and Tlaxcala; also, moderate to extreme (D2-D3) drought coverage decreased on the southern coasts from Michoacán, Guerrero and Oaxaca.

The greatest rainfall deficits were observed throughout the north of the country once again. This was reflected in the monthly rainfall statistics since 1941. At the state level, Chihuahua had their driest August, Durango and Zacatecas had their second driest August, while Coahuila and Nuevo León recorded their third driest August. For the June-August 2020 period, Chihuahua also topped the statistics with their driest period, followed by San Luis Potosí (4th) and Hidalgo (5th) driest June-August period.

Scarce rainfall in the northern parts of the country led to an increase in moderate to severe (D1-D2) drought areas, especially in Sonora, Chihuahua, Coahuila, Durango and Sinaloa. Extreme drought (D3) developed and covered less than 1% of Sonora, Chihuahua and Coahuila. The moderate to extreme (D1-D3) drought coverage was 25.65% of the country at the end of August, an increase of 5.97% compared with the numbers at the end of July this year.

The national mean temperature for August 2020 was 26.6 °C (79.9 °F), 2.9 °C (5.2 °F) above the 1981-2010 average, and was classified as the second warmest August since 1953. For the month, the states of Sonora, Chihuahua and Sinaloa recorded their warmest August, while Baja California, Durango and Mexico City had their second warmest August. Temperature anomalies up to 5 °C (9 °F) above average (1981-2010) were seen in portions of Chihuahua, Durango, Coahuila, San Luis Potosí, Querétaro and Hidalgo.

Due to drought conditions, the population in the northern states were concerned about agricultural and livestock activities. Specifically, in the Cinco Manantiales region of Coahuila, the producers reported that the wells are drying up due to the prolonged drought, and springs are at 50 percent capacity; corn producers in northern Coahuila have been affected as well as cattle ranchers since, due to the lack of forage, some of them have made the decision to sell their sheep herds.